
SUICIDE IN NEW JERSEY, 1999 - 2000

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Abstract

While suicide rates in New Jersey are among the lowest in the nation, suicide remains a significant cause of preventable mortality. In 2000 there were approximately 600 suicides in the state. Suicide rates are highest among non-Hispanic white males, particularly those aged 65 years and older. For all racial and ethnic groups, suicide rates are higher for males than for females, although females have higher rates of unsuccessful suicide attempts. Firearms, suffocation, and poisoning are the three leading means used to commit suicide. Males are more likely than females to use firearms. Suicide follows a pronounced spatial pattern in New Jersey, in which rates are generally higher in the more rural counties located in the south and northwest parts of the state. This geographic pattern is strongest among white males, and mirrors a national geographic pattern in which suicide rates are highest in rural states. Higher rural suicide rates may be explained in part by the greater prevalence of firearms in these areas.

Introduction

Nationally, suicide rates are lowest in densely populated Northeastern states (Singh et al, 2002). In fact, only Massachusetts, New York and the District of Columbia have lower suicide rates than New Jersey. Nevertheless suicide remains a major cause of preventable mortality in New Jersey. There were close to 600 suicides in the state in 2000, nearly twice the number of homicides for that year. Suicide was the third leading cause of death for those aged 15-24 years, and the fifth leading cause for those aged 25-44 years. However suicide rates are by far the highest for males over age 65 years. Suicide rates are highest among non-Hispanic whites, and for all race and ethnicity groups, rates are considerably higher among males than females. Suicide rates are notably higher in southern and northwestern counties than elsewhere in the state.

The causes of suicide are complex, and have to do with mental illness, particularly depression, and/or adverse circumstances such as job loss or marital problems. The causes and characteristics of suicide attempts vary for different sub-populations. Suicide attempts among younger people tend to be impulsive and communicative acts, often involving relatively non-lethal means. Among older adults, especially males, suicide is often long planned and associated with major (and often untreated) depression. Older adults are more likely to use lethal methods, particularly firearms, and are far more likely to be successful (Szanto et al, 2002). Suicide prevention efforts largely consist of crisis services such as hotlines, and mental



health treatment for at risk individuals. Prevention efforts are also increasingly focused on restricting access to lethal methods of suicide, especially, but not exclusively, firearms. Restricting the purchase of handguns by those with a history of mental illness is an important component of suicide prevention, as is identifying older adults who require treatment for depression.

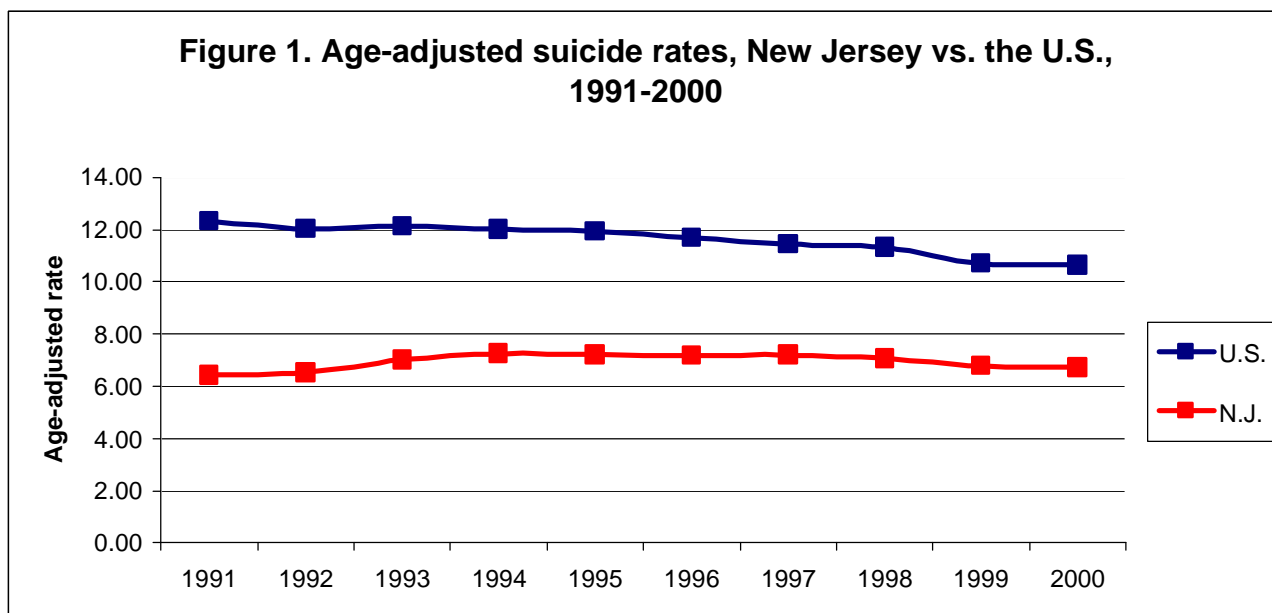
Data and Methods

Data on suicides come from New Jersey death certificates, which include information about cause and mechanism of death as well as demographic characteristics of the decedent. Rates are calculated using data from the 2000 census. Age-adjusted rates are based on the 2000 standard million population. Data from the Behavioral Risk Factor Surveillance Survey as well as the Centers for Disease Control and Prevention's web-based query system, WISQARS, were also used.

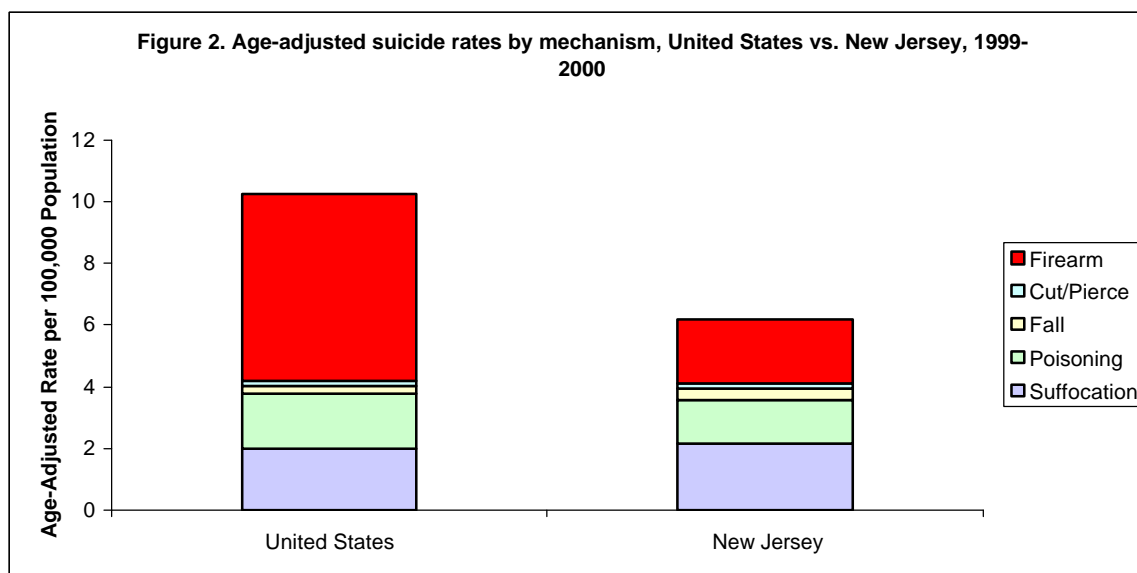
Results

New Jersey vs. United States

New Jersey's suicide rates have been consistently below national averages over the last decade, as seen in **Figure 1**. During the 1990s, the gap narrowed somewhat, primarily due to a decline in the age-adjusted suicide rate for the nation as a whole. In the case of firearm



suicides, the difference between New Jersey and rest of the nation is even greater. Firearms are a relatively less important mechanism for suicide in New Jersey. This is reflected in **Figure 2**, which shows that the difference in age-adjusted suicide rates between New Jersey and the nation in 1999-2000 is almost completely attributable to differences in firearm suicide rates, since rates for other mechanisms are essentially the same. This may be a result of New Jersey's relatively strict gun control policies.



Gender, Age, Race, Ethnicity

Suicide rates are far higher among males. Among males, suicide rates in 1999-2000 have a pronounced age pattern, and rise sharply after age 75, as can be seen in **Table 1** and **Figure 3**. Female rates are far lower, peak slightly in the middle age years and then remain essentially flat. While adolescent suicide results in the greatest years of potential life lost per person and is the target of many prevention efforts, age-specific rates are clearly the highest among elderly males. The suicide rate for males aged 65 and over has declined somewhat since 1998, but the rate for those aged 45-64 years increased sharply during the same time period – from approximately 13 to 17 per 100,000 population.

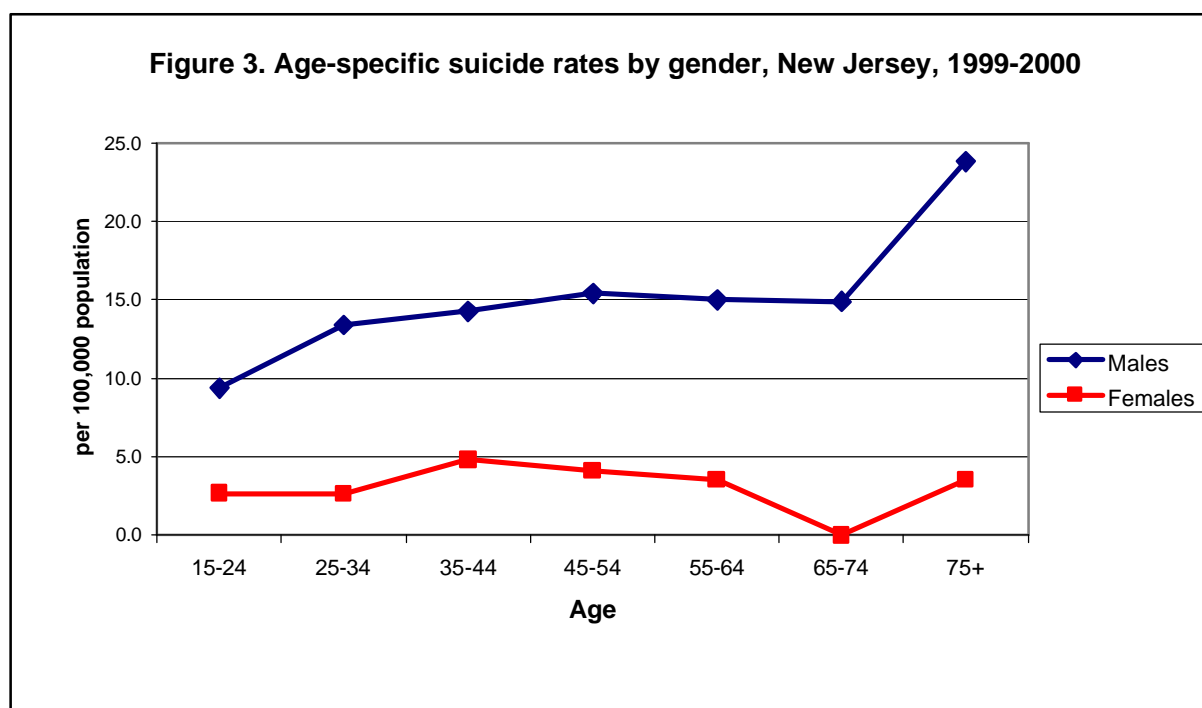
Nationally, suicide rates among the elderly began to rise again in the 1980s, after decades of decline. Risk factors for elderly suicide include depression, alcohol abuse and social isolation. As seen, rates are far higher for males than for females, and the most common mechanism used by men is firearms. Divorced or widowed men have higher suicide rates than do married men. As compared with those committing suicide at younger ages, older people are more likely to have physical illnesses and affective disorders, and have often visited a health care provider shortly before their suicide (MMWR, 1996).

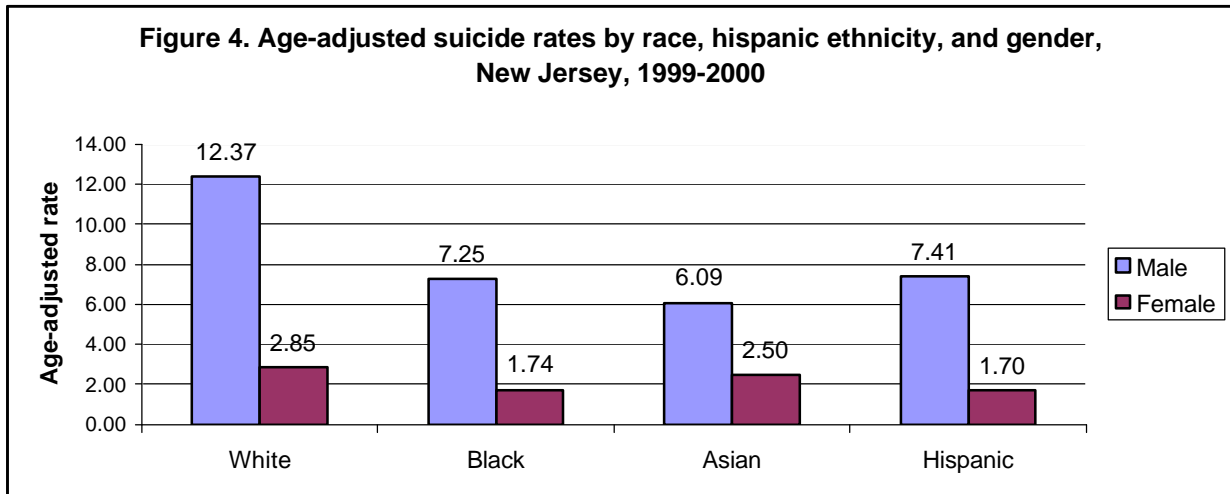
There is a striking contrast between the age pattern of suicide rates for older males versus females. Research on suicide suggests that risk factors for male and female suicide are very different. In the case of males, factors associated with socioeconomic status and financial success were significantly related to the likelihood of a suicide attempt, while for women, measures of social and environmental stability were far more important. A term sometimes used to describe the cause of suicide in older males is “cumulative loss”, referring to the fact that for some men, aging and retirement bring with them a reduction in social status and income which has a profound negative effect on psychological well being. Depression is often a precursor to suicide, and many elderly men resort to alcohol and prescription drug over-use to self-medicate themselves for depression, a pattern of behavior which is highly conducive to suicide (Coren and Hewitt, 1999). While physical infirmities and/or chronic pain are often precipitating factors in suicide by the elderly, relatively few suicides are motivated by terminal illness. Yet a recent study found that the elderly who commit suicide were more likely to suffer

from certain chronic conditions, especially depression, than was a randomly selected matched cohort (Quan, et al, 2002).

Suicide rates are highest among non-Hispanic whites, but the male-female ratio in suicide rates is roughly similar for all racial groups, as shown in **Figure 4**. The ratio of male to female suicide rates is lowest for Asians, and is highest for non-Hispanic whites. However the age pattern of suicide is not the same for all races. Among non-Hispanic white males, for example, more than 20 percent of suicides occur at ages over 65 years, as opposed to only five percent for non-Hispanic black males, eight percent for Asians and eleven percent for Hispanics.

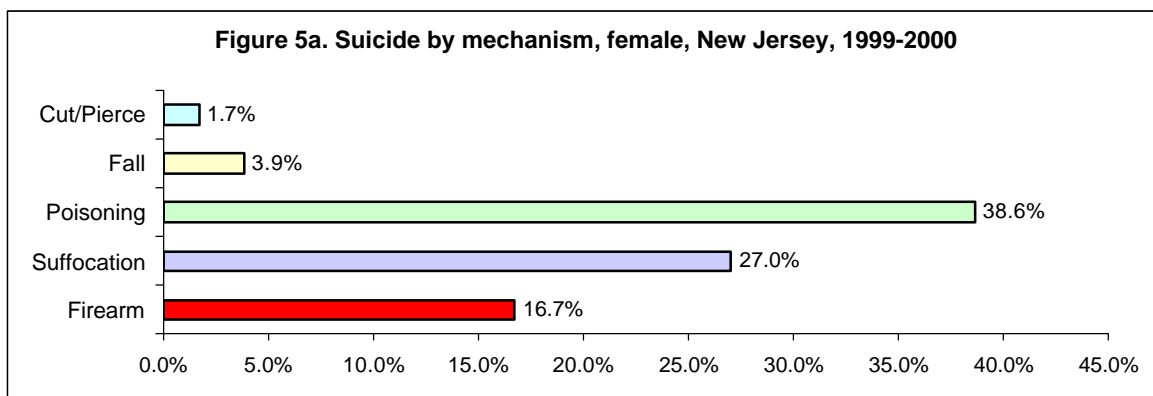
Table 1. Suicide in New Jersey, by age and gender, 1999-2000						
Age	Both Sexes		Male		Female	
	(N)	Rate	(N)	Rate	(N)	Rate
0-15	7	-	7	-	0	-
15-24	121	6.1	95	9.4	26	2.7
25-34	170	8.4	145	13.4	25	2.6
35-44	270	9.5	200	14.3	70	4.8
45-54	214	9.6	167	15.4	47	4.1
55-64	132	9.0	105	15.0	27	3.5
65-74	90	7.8	76	14.9	14	-
75+	118	11.0	94	23.8	24	3.5
Age-adjusted rate	1123	6.8	890	11.4	233	2.7





Mechanism

The major mechanisms used in suicides in New Jersey are firearms, suffocation (usually hanging) and poisoning. Firearms and suffocation are the two most lethal means. Males are far more likely than females to use firearms, while females are more likely to use poisoning (**Figures 5a** and **5b**). In general, females are more likely to use less-lethal mechanisms, and they have a far higher ratio of unsuccessful to successful suicide attempts than do males. Mechanism also varies with age. The use of firearms increases greatly at older ages. By age 65, more than forty percent of suicides are committed with firearms. Suffocation is most common at ages under 65 years. Poisoning, which includes carbon monoxide from auto exhaust in addition to overdose of prescription medications, illicit drugs and other substances, is most used between the ages of 35 and 64 years, although suffocation is the leading mechanism for this age group (**Table 2**).



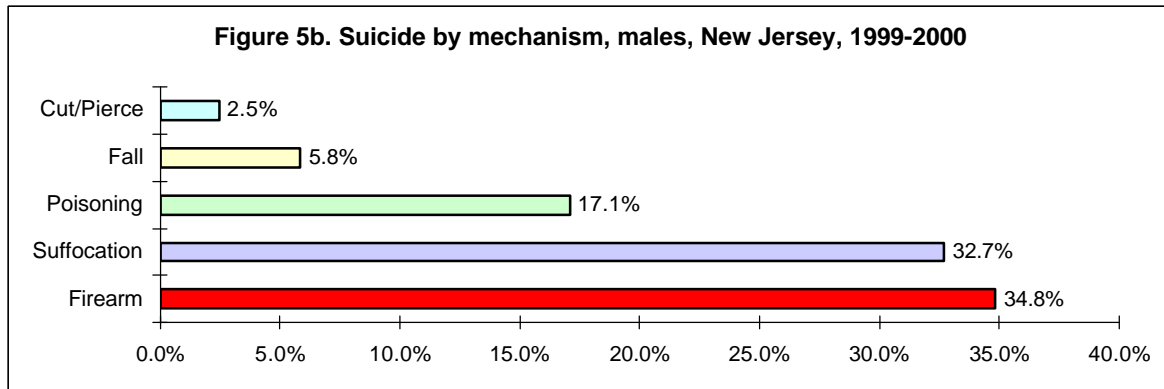
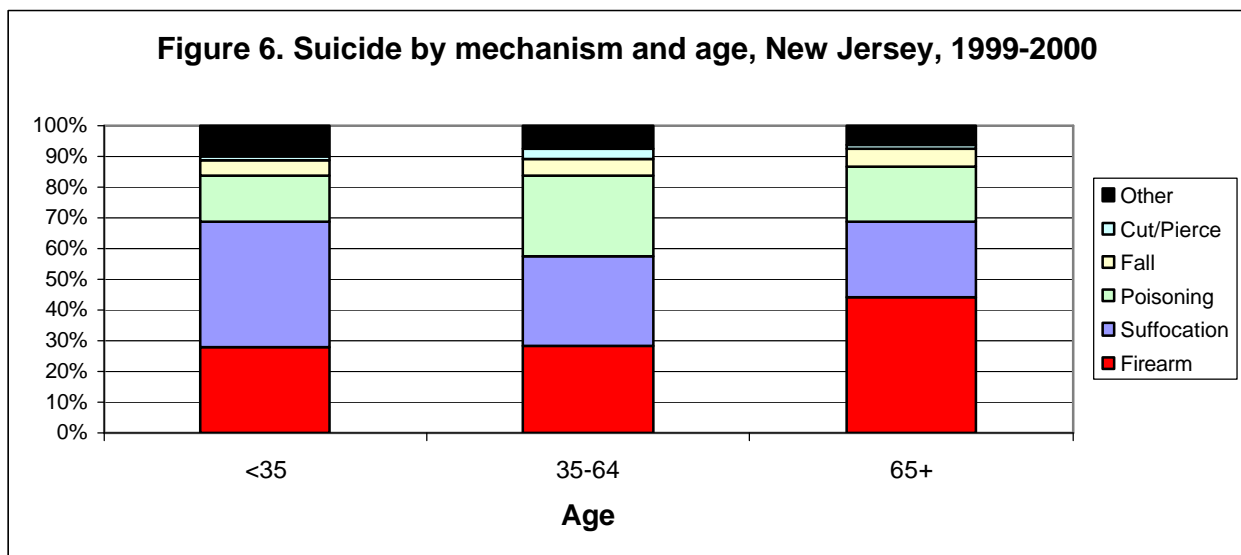
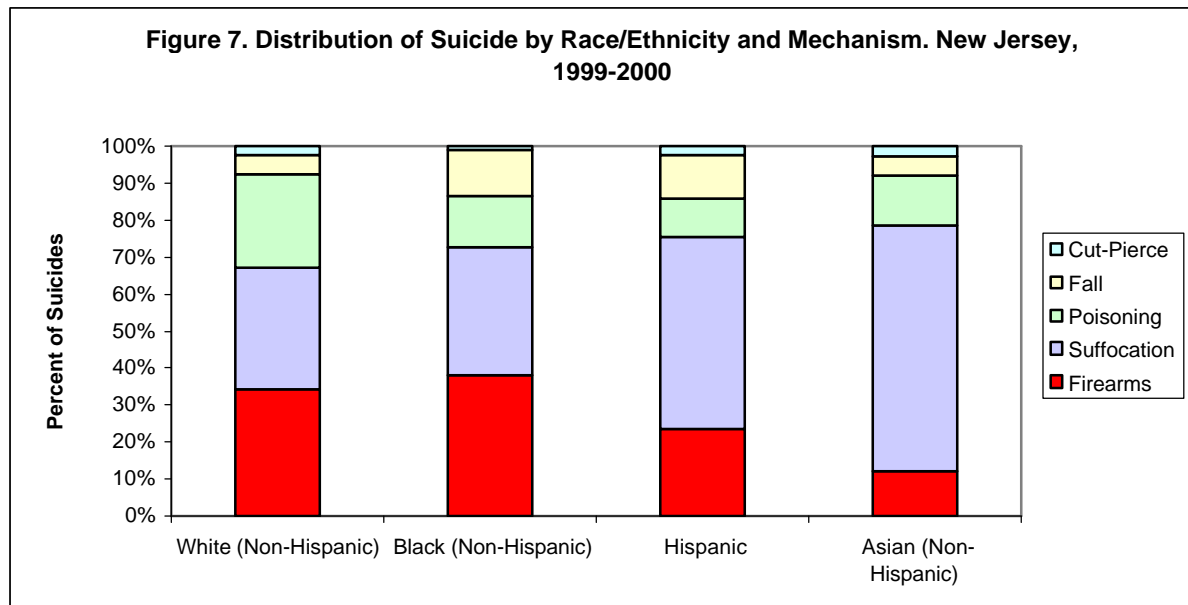


Table 2. Suicide by mechanism, gender and age, New Jersey, 1999-2000												
	Gender						Age					
	Total	%	Male	%	Female	%	<35	%	35-64	%	65+	%
Firearm	349	31.1%	310	34.8%	39	16.7%	83	27.9%	174	28.2%	92	44.2%
Suffocation	354	31.5%	291	32.7%	63	27.0%	122	40.9%	181	29.4%	51	24.5%
Poisoning	242	21.5%	152	17.1%	90	38.6%	45	15.1%	160	26.0%	37	17.8%
Fall	61	5.4%	52	5.8%	9	3.9%	15	5.0%	34	5.5%	12	5.8%
Cut/Pierce	26	2.3%	22	2.5%	4	1.7%	3	1.0%	20	3.2%	3	1.4%
Other	91	8.1%	63	7.1%	28	12.0%	30	10.1%	47	7.6%	13	6.3%
Total	1123	100.0%	890	100.0%	233	100.0%	298	100.0%	616	100.0%	208	100.0%



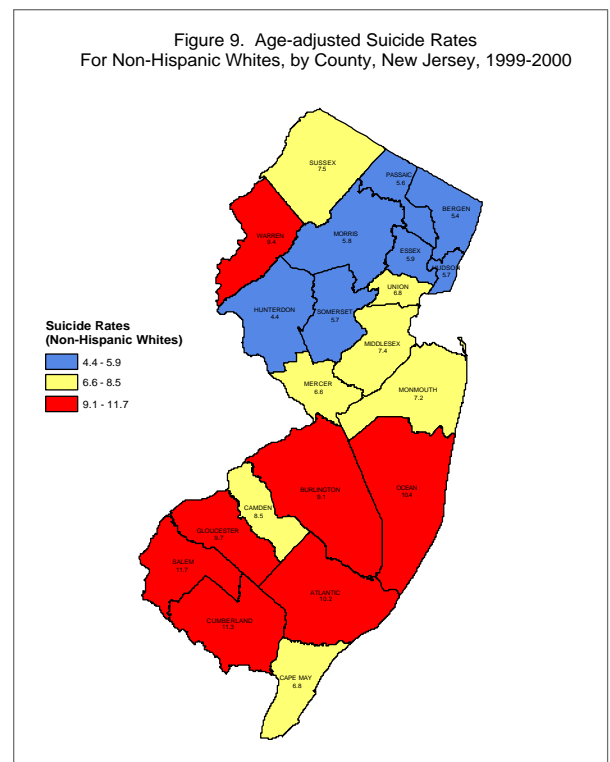
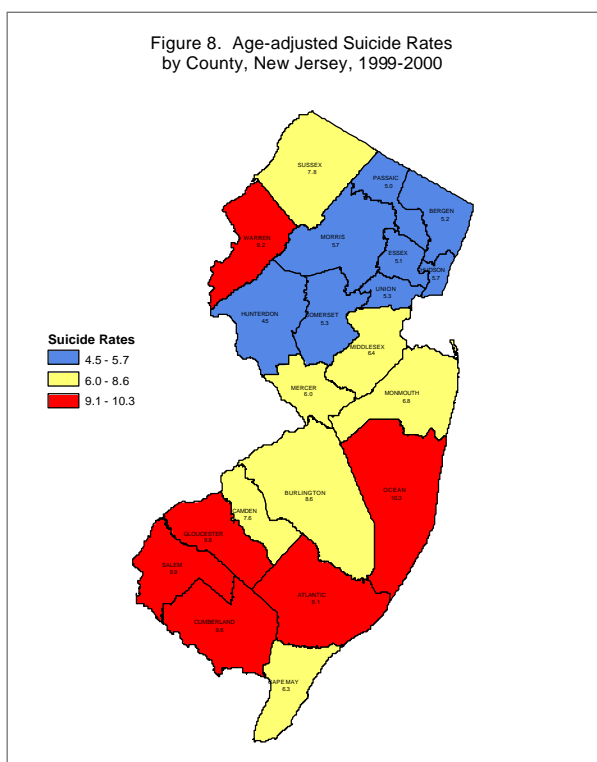
At all ages, firearm use is far more prevalent among males than females, a pattern which is true for all racial groups. The proportion of suicides committed with firearms is highest among non-Hispanic blacks and whites, as compared with Hispanics and Asians. Non-Hispanic whites have the largest share of suicides by poisoning, while the share of suicides by suffocation (usually



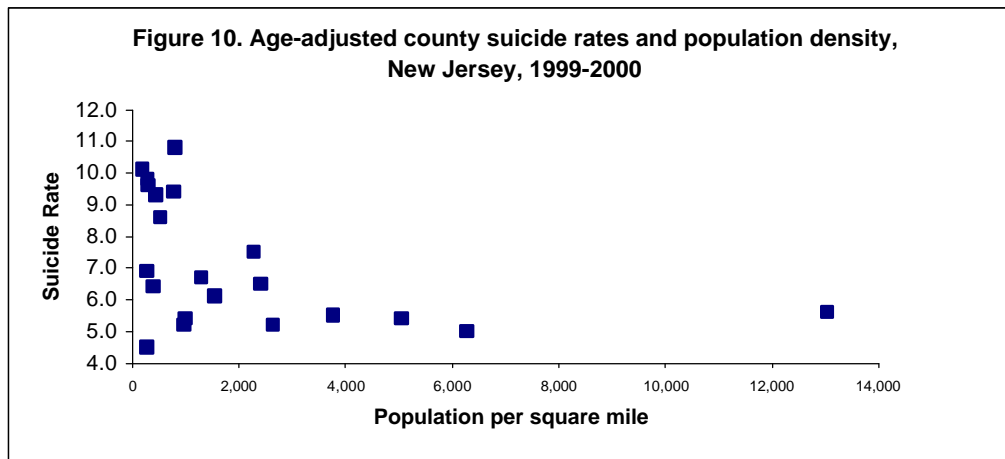
hanging) is highest among Asians. **Figure 7** shows the distribution of suicide by mechanism for different race and ethnicity groups.

Geography

There is a significant spatial pattern to suicide in New Jersey. Age-adjusted rates are highest in the southern and northwestern counties. This spatial pattern is even more pronounced in the case of suicide rates among whites, as shown in **Figures 8 and 9**.



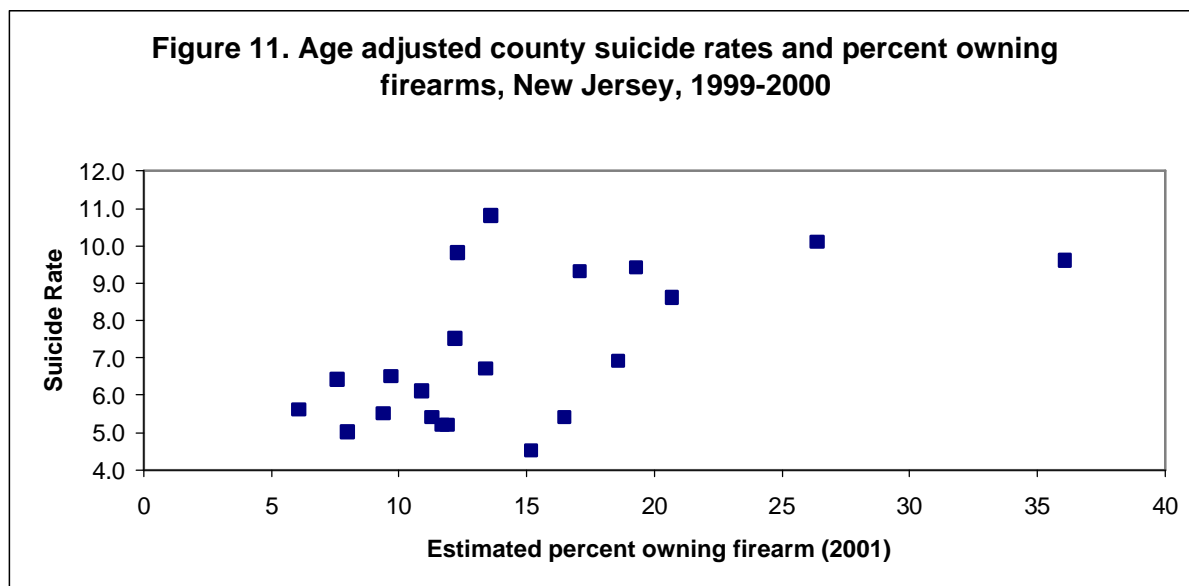
The counties where suicide rates are highest are in general the counties where population density is lowest. The relationship between county suicide rates and population density is reflected in **Figure 10**, where the scatter plot suggests a negative correlation ($r = .43$, $p = .01$)



In this sense New Jersey appears to be a microcosm of the nation as a whole. Nationally, suicide rates are highest in states with relatively low population density such as Wyoming and Alaska (Frankel and Taylor, 1992; Wilkinson and Israel, 1984; Saunderson, Haynes, and Langford, 1998). This rural-urban differential has been increasing in recent years (Singh and Siahpush, 2002).

The reasons for the rural-urban difference are not clear. One theory is that low population density results in a lack of social integration, which increases the likelihood of suicide. Studies of the rural-urban suicide differential have emphasized factors such as the transition away from an agricultural economy, loss of population, marital instability, and an increasing proportion living alone as factors which reduce social integration in rural settings (Trout, 1980; Fernquist and Cutright, 1998; Seeman, 1996). It may be that there is a selection effect, in which low density places retain and attract those with relatively poor psychological well being. National studies have shown that suicide rates are even higher among migrants to rural areas than among native rural residents (Morrell et al, 1999; Dudley et al, 1998). Another possibility is that at-risk individuals in low population density areas may be less likely to receive adequate treatment for mental illness, alcohol abuse, and other conditions which increase the risk of suicide. It is also the case that areas with low population density are areas with a relatively high prevalence of firearms, which has been associated with higher suicide rates in several studies (Lester, 1998; Miller 2002; Yang and Lester, 1991).

Access to firearms has been assessed by using measures such as gun control laws, the prevalence of gun stores, unintentional firearm injuries, and the number of subscribers to firearms-related magazines (Lester, 1998). Another source of data on firearm ownership is the Behavioral Risk Factor Surveillance Survey (BRFSS), which asks respondents whether or not there is a firearm in their home. BRFSS data were used to estimate gun prevalence by county. Due to the relatively small sample size, several years of data were combined to get county level estimates. The BRFSS estimates were highly correlated with county estimates of gun shops per capita, but the BRFSS data on gun ownership were used here to assess firearm prevalence since the measure is more direct. The relationship between firearm ownership and county suicide rates is shown in **Figure 11**. As can be seen there appears to be a positive correlation ($r = .54$, $p = .01$).



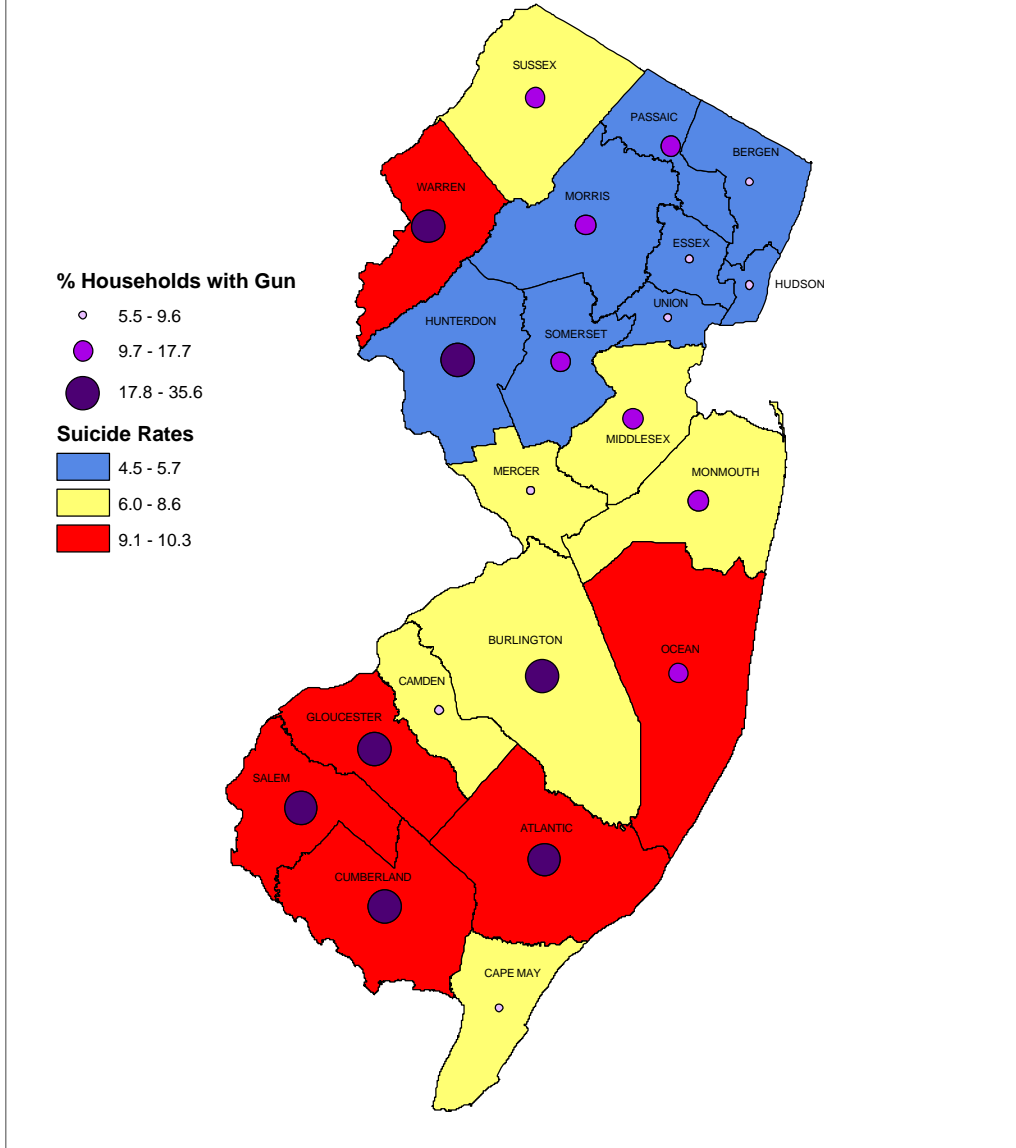
When counties are ranked by suicide rate, as in **Table 3**, it can be seen that those with relatively high rates of proxied firearm prevalence tend to be located in the South or Northwestern part of the state. In general, these counties have above average suicide rates, and the percent of suicides committed with a firearm in these counties is also above average. While male suicide rates vary considerably with firearm prevalence, female rates do not. This is consistent with the fact that firearms are a less commonly used suicide mechanism for women. Overall, it is clear that the difference in firearm prevalence does not account for all of the difference in suicide rates between rural and urban counties. Ocean County, for example, has the highest suicide rate in the state, but the percent of these suicides which were committed with firearms is only slightly above the state average (36.4% versus 31.1% overall).

Finally, **Figure 12** shows suicide rates and estimated firearm prevalence. It can be seen that in general, counties with high suicide rates have high rates of estimated gun ownership. Yet there are outliers, such as Hunterdon County, which has both above average gun ownership and below average suicide.

Table 3. Gun prevalence and age-adjusted suicide rates, New Jersey Counties, 1999-2000

Counties	Age-adjusted suicide rate	Percent owning a firearm	Percent of suicides committed with firearms
Ocean	10.3	17.7	36.4
Salem	9.9	21.0	38.5
Gloucester	9.8	18.3	35.4
Cumberland	9.6	35.6	57.1
Warren	9.2	18.5	25
Atlantic	9.1	18.2	27.7
Burlington	8.6	17.9	47.9
Sussex	7.8	17.1	50
Camden	7.6	8.9	26.3
Monmouth	6.8	10.5	25.3
Middlesex	6.4	10.4	28.9
Cape May	6.3	6.2	30.8
Mercer	6	9.6	30.2
Morris	5.7	17.4	29.4
Hudson	5.7	5.5	14.7
Somerset	5.3	10.9	32.3
Union	5.3	8.7	26.8
Bergen	5.2	8.7	22.7
Essex	5.1	7.2	27.5
Passaic	5	13.4	39.2
Hunterdon	4.5	24.3	54.5
State	6.8	11.9	31.1

Figure 12. Age-adjusted Suicide Rates and Percentage of Households with a Gun by County, New Jersey, 1999-2000



Discussion

New Jersey data shows that middle aged and older white males are at relatively high risk for suicide. Additionally, there is a strong geographical pattern, as residents of southern and northwestern counties have significantly higher suicide rates. This geographic variation is even more pronounced for white males, and may be in part related to the prevalence of firearms.

The elderly are at particular risk for suicide, yet they may not use prevention hotline services and are often reluctant to seek mental health treatment. New suicide prevention strategies may need to be developed for this population. Many elderly people suffer from untreated depression, which, along with alcohol abuse, are significant risk factors for suicide. Prevention strategies geared at older persons may involve peer counseling, and efforts to raise awareness of risk factors among those who have frequent contact with the elderly, such as visiting nurses, home health aides, congregate housing staff and physicians. Older white males who are gun owners may be considered to be at particularly high risk, and health providers may wish to counsel them and their family members about the risks posed by the presence of a gun in the home.

While mental health treatment and crisis intervention function by addressing individuals who might be contemplating suicide, there is also a growing interest in developing more population – based suicide prevention efforts (Knox et al, 2004). In particular, there is interest in modifying the environment to make suicide more difficult. In recent years there has been a growing interest in controlling access to certain means of committing suicide, particularly firearms. While suicide mechanisms vary around the world, the World Health Organization recently endorsed the general idea of “controlling the environment” as a way to prevent suicide (Leenaars et al, 2000; Leenaars et al, 2003). A variety of studies have suggested that the immediate availability of various types of methods have an effect on suicide rates, since substitution between methods is not complete (Lester, 1998). This view of suicide suggests that those considering suicide are often only willing to use one method, and if it is not available their suicide may be prevented. A recent review of the research argues that there is a considerable amount of impulsivity in many suicide attempts, and that reducing access to highly lethal methods is a promising approach to prevention. (Miller, 2002)

A study by Kreitman (1976) about the suicide rate in Britain and the detoxification of coal gas was the first to make an empirical case for a relationship between suicide and availability of a means. In the case of firearms, a number of studies have shown that state variations in suicide rates are related to handgun control laws, particularly those laws which govern the selling and purchasing of guns. (Lester 1998; Yang and Lester, 1991).

One set of potential policy recommendations related to firearm access would involve strengthening gun control laws, particularly those governing handgun purchases. Enhancing background checks so that they are more likely to screen out those with a history of depression or other mental illness is one recommended intervention. Other suggested interventions involve making guns safer, for example by creating “smart guns”, which can only be fired by their owners. This would have most benefit in the prevention of firearm suicide by adolescents and young adults, who might use a parent’s gun. Storage laws can also be enacted, which require that guns be stored in locked locations.

However, a significant reduction in suicide in New Jersey will probably not be accomplished through additional gun control policy. The state already has relatively strict handgun control regulations and laws. A “smart gun” law was signed in 2002 which will apply to new handguns (http://www.njleg.state.nj.us/2002/Bills/PL02/130_.HTM) While further restricting impulsive handgun purchases by the mentally ill would probably prevent some suicides, the geographic relationship between firearm prevalence and suicide rates suggests that impulsive firearm purchases are not a major part of the problem. While legal access to firearms does not vary within the state, rates of actual firearm ownership vary significantly, as has been shown. Gun ownership rates within the state vary for reasons which are almost certainly unrelated to suicidal ideation. The prevalence of firearms is greater in rural counties where population density is

lower and hunting may be more popular. However, the presence of a firearm in the home increases the risk for suicide (Brent, 2001).

The link between firearm prevalence and suicide in New Jersey provides an opportunity for prevention efforts based on the premise that those with a gun in their household are at elevated risk for suicide. Gun magazines and shooting clubs and other gun-related organizations could be vehicles to target this at-risk group with suicide prevention information. Counties and municipalities with high gun ownership rates could provide more suicide prevention information and services to their residents. Health professionals can better educate patients and their families about risks associated with keeping a firearm in the home.

It is important not to overemphasize the role that firearms play in suicides. Untreated mental illness and alcohol abuse are other major risk factors. Further, differences in firearm prevalence do not explain all of the difference between suicide rates in rural and less rural counties. An ample body of research in this country and others has demonstrated a consistent rural-urban differential in suicide rates and it has been shown that measures of social integration have been significant predictors of the differences (Singh and Siahpush, 2002). Older white males living alone in rural areas are a relatively high risk group. This group may have insufficient contacts with health providers, and may be suffering from untreated depression and alcohol abuse. Through the provision of information and treatment services to New Jerseyans who are at high risk of suicide, and the strengthening of resources in communities where suicide rates are highest, this tragic cause of preventable mortality can hopefully be reduced.

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